Agilent Ref.: 10981377-4

Application Serial No.: 10/020,693

To: USPTO

AMENDMENTS

In the Claims:

Claims 1-36 (Cancelled).

- (Currently Amended) A method of modulating fluid flow along a flow path 37. of a micro-fluidic device, said method comprising: modulating the physical state of a micro-valve positioned in said flow path, wherein said micro-valve comprises a phase reversible material stably associated with a high surface area component, and both of said phase reversible material and sald high surface area component are present in said flow path.
- 38. (Original) The method according to claim 37, wherein said phase reversible material is a phase reversible polymer.
- 39. (Original) The method according to claim 38, wherein said phase reversible polymer is a thermoreversible polymer.
- 40. (Original) The method according to claim 37, wherein said modulating comprises changing the temperature of said thermoreversible polymer.
- 41. (Original) The method according to claim 37, wherein said modulating occurs by actuation of a phase reversing means.
- 42. (Original) The method according to claim 41, wherein said phase reversing means is completely external to said device.
- 43. (Original) The method according to claim 41, wherein at least one component of said phase reversing means is internal to said device.

Claims 44 -45 (Cancelled)

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- 46. (Previously Presented) The method according to claim 37, wherein said phase reversible material goes from a first permeable state to a second impermeable state.
- 47. (Previously Presented) The method according to claim 37, wherein said device comprises two intersecting flow paths.

48. (Cancelled)

- 49. (Previously Presented) The method according to claim 37, wherein said high surface area component is stably associated with at least one wall of said fluid flow path.
- 50. (Previously Presented) The method according to claim 37, wherein said high surface area component is maintained in said flow path by a retaining means.
- 51. (Previously Presented) The method according to claim 37, wherein said high surface area component comprises an array of posts bonded to said at least one surface of said flow path.
- (Previously Presented) The method according to claim 37, wherein said micro-fluidic device comprises at least one micro-compartment.
- 53. (Previously Presented) The method according to claim 52, wherein said micro-compartment is a micro-channel.
- 54. (Previously Presented) The method according to claim 38, wherein said phase reversible polymer is an N-isopropylacrylamide copolymer.
- 55. (Previously Presented) The method according to claim 38, wherein said phase reversible polymer is a polyalkylene oxide.

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56. (Currently Amended) A method of modulating fluid flow along a flow path of a micro-fluidic device, said method comprising: modulating the physical state of a micro-valve positioned in said flow path, wherein said micro-valve comprises a phase reversible material stably associated with said microvalve and said phase reversible material goes from a first permeable state to a second impermeable state, and both of said phase reversible material and said high surface area component are present in said flow path.

- 57. (Previously Presented) The method according to claim 56, wherein said phase reversible material is a phase reversible polymer.
- 58. (Previously Presented) The method according to claim 57, wherein said phase reversible polymer is a thermoreversible polymer.
- 59 (Previously Presented) The method according to claim 57, wherein said phase reversible polymer is an N-isopropylacrylamide copolymer.
- 60 (Previously Presented) The method according to claim 57, wherein said phase reversible polymer is a polyalkylene oxide.
- 61. (Previously Presented) The method according to claim 57, wherein said modulating comprises changing the temperature of said thermoreversible polymer.
- 62. (Previously Presented) The method according to claim 57, wherein said modulating occurs by actuation of a phase reversing means.
- 63. (Previously Presented) The method according to claim 62, wherein said phase reversing means is completely external to said device.
- 64. (Previously Presented) The method according to claim 62, wherein at least one component of said phase reversing means is internal to said device.
 - 65. (Previously Presented) The method according to claim 57, wherein

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said device comprises two intersecting flow paths.

- 66. (Previously Presented) The method according to claim 57, wherein said micro-valve comprises said phase reversible material stably associated with a high surface area component.
- 67. (Previously Presented) The method according to claim 57, wherein said micro-valve comprises said phase reversible material stably associated with a high surface area component.
- 68. (Previously Presented) The method according to claim 67, wherein said high surface area component is stably associated with at least one wall of said fluid flow path.
- 69. (Previously Presented) The method according to claim 67, wherein said high surface area component is maintained in said flow path by a retaining means.
- 70. (Previously Presented) The method according to claim 67, wherein said high surface area component comprises an array of posts bonded to said at least one surface of said flow path.
- 71. (Previously Presented) The method according to claim 57, wherein said micro-fluidic device comprises at least one micro-compartment.
- 72. (Previously Presented) The method according to claim 71, wherein said micro-compartment is a micro-channel.
- 73. (New) The method according to claim 37, wherein said phase reversible material is covalently bonded to said high surface area component.
- 74. (New) The method according to claim 37, wherein said microvalve occupies a length of said flow path that is at least about 50 µm long.

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- *7*5. (New) The method according to claim 37, wherein said high surface area component comprises a mechanical element.
- 76. (New) The method according to claim 37, wherein said mechanical element of said high surface area component is a rod or a pin.
- 77. (New) The method according to claim 53, wherein said microchannel has a cross-sectional dimension of from about 10 to 250 μm .